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ABSTRACT

The need for higher education to take a proactive rather than a reactive stance in dealing with the impact of the computer is considered. The field of computerized video technology is briefly discussed. It is suggested that disparate groups such as the liberal arts and business faculties should cooperate to maximize the use of computer technology. The liberal arts faculty brings expertise in philosophical issues and in the content of the general education program. Liberal arts disciplines utilize the computer in a variety of ways (e.g., for an analysis of variables underlying the French Revolution, for analyzing a literary text into individual words). The business faculty has expertise in financial/accounting applications of the computer as well as the ability to identify needs of student segments and types of courses that meet student needs. The use of "stakeholder" analysis to make decisions about future activities and three preparatory steps are addressed. Preparatory activities involve forming a steering committee from liberal arts and business faculties, assessing the external environment, and generating alternative courses of action. Stakeholder analysis provides a thorough analysis of all the major facets of a proposed course of action. (SW)

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ADAPTING TO A COMPUTER-ORIENTED SOCIETY: THE LEADERSHIP ROLE OF BUSINESS AND LIBERAL ARTS FACULTIES

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Introduction

For organizations to survive, they need to aline their internal strengths and weaknesses with the threats and opportunities in the external environment. Institutions of higher education are no exception.

Computers are changing the external environment of higher education. Within ten years or so, it is likely that many people will have sophisticated technology in their homes which, among other things can be used as powerful teaching/learning tools. In effect, this poses a competitive threat to higher education. While the degree to which this is a threat is not clear at this time, there is at least the possibility that students will find it more convenient, less expensive, or more productive to acquire some or all of their education at home.

And how will higher education respond to this threat? I hope not in the way that many organizations respond to changes in their environment, and that is to wait for the changes to occur and then react to them. As Herbert Simon says, "most often we have been constrained to anticipate events just a few years before their occurrence, or even while they are happening, and to try to deal with them, as best we can, as they are engulfing us.1/

Kenneth Seib, professor of English at California State University at Fresno, makes the same point in his three Laws of Acadynamics:

1. By the time educators recognize a problem it is probably beyond solution.

2. Academic administrators will call for damn near anything as long as it will bring more financing and maintain the status quo.

1/ Herbert A. Simon, "What Computers Mean for Man and Society," Science, 195 (March 18, 1977): 1186.

HE017 166

3. In academe, thinking about the unthinkable is unthinkable.2/

This paper argues the case for higher education to take a proactive rather than reactive stance in dealing with the computer's impact. To do otherwise could leave higher education trying to catch the caboose on a train that has already pulled out of the station.

Colleges and universities have the intellectual resources to assess the likely impact of technology-driven changes, and to participate in the development of the new teaching/learning delivery systems which will emerge from the computer revolution. Such a proactive response will require that disparate groups on campus, such as the liberal arts and business faculties, work together to develop an appropriate course of action. Later in this paper I'll discuss a technique that can be used for that purpose. But first, lets discuss some dimensions of the home computer revolution.

Computerized Video Technology

Computer assisted instruction and video tape technologies have been around for over twenty years and have been used with increasingly good results in a variety of teaching/learning situations. More recently the capabilities of these technologies have been enhanced by data bases and other services available to computer users via telephone lines.

Computerized video technology is in its infancy. We are just now learning how to use it for educational applications. Schneider and Bennion of the McKay Institute at Bringham Young University describe educational projects underway that utilize computerized videodisc technology.

> At present, we are working on two videodiscs that will use a very different instructional protocol. The first disc will simulate a visit to a Mexican town. It is intended for advanced conversation students who are preparing for their first trip to a Latin American country. The second disc simulated a few days in the United States, as it would be seen by a Latin American visitor. It is designed for students who have had classroom English before coming to the United States, but who are not familiar with American idioms and customs.

2/ Kenneth Seib, "How the Laws of Acadynamics Work to Prevent Change." The Chronicle of Higher Education, January 25, 1984, p. 72.

> Both of these discs work in the same way: the inhabitants converse with the student by speaking directly to the camera, and the videodisc then freezes the image until the student replies. The inhabitants respond as if they had actually heard the student. This is possible because the student has told the computer which one of several possible replies he intends to give, and the computer has told the videodisc player which scene to show next. The student's replies are given orally, in the target language, and they are recorded on a cassette tape. The tape can be played back for the instructor's critique after the session, but the student can also replay the most recent reply, and compare it to the same reply given by a surrogate student, who has been pre-recorded on the disc. One side of each disc assumes a male student, and the other side a female student. This is necessary because of the explicit genders in the Spanish language; it also makes the experience more realistic.3/

There are other interesting applications as well. The American Heart Association has developed an interactive videodisc program to provide instruction in cardiopulmonary resuscitation (CPR). A full description is available elsewhere, but the significance is that the interactive video system taught CPR better than a live instructor.

> Our early tests show that we accomplished what we set out to do. The CPR student never sees an instructor or a keyboard but is taught CPR skills and is certified more quickly and with higher standards than a live instructor can achieve.4/

It should be stressed that these examples are based on technology that currently exists. Significant advances in laser technology are occurring rapidly. Laser cards (the size of a credit card) may replace floppy discs as a storage medium and may permit rapid advances in laser video technology.5/

With the development of such hardware, it can be expected

3/ E. W. Schneider and Junius Bennion, "The McKay Institute Videodisc Project: Rationale, History and Goals," Computers and the Humanities, 16 (September 1982): 36-37.

4/ David Hon, "Interactive Training in Cardiopulmonary Resuscitation," BYTE, June, 1982, p. 108.

5/ Phoebe Hoban, "Laser Cards", Omni, December, 1983, p. 32.

that commercial companies will recognize the potential inherent in providing educational material of an interactive nature. Maritz, a commercial communications company, is already at work on such educational software. It is likely that there are others as well.

The significance of these developments is that in ten years or so many homes will have the hardware, and access to software, that will modify the need for students to physically transport themselves to their local college or university in order to acquire an education.

While the specific nature of the impact of this new technology is difficult to foresee, there are two disiplines within higher education which are central to an institution's efforts to become proactive with respect to these changes. These two areas are business and the liberal arts. Each faculty has unique skills to contribute. Together they complement one another and collectively provide the skills needed to lead the institution's proactive process with regard to the impact of computer technology.

The Liberal Arts Faculty

First, the liberal arts faculty brings expertise in philosophical issues. Of the many facets of philosophy that could be mentioned two are of interest to us here: (1) those skills which help man explore and theorize about the nature of the universe and the way its parts and whole interdepend,6/ and (2) those skills related to helping individuals develop their own philosophy of education.

The liberal arts faculty also brings expertise in the content of a general education, such as history, literature, philosophy, communications, the fine arts, etc.

And lastly, they have expertise in using computers for a variety of liberal arts applications. The widespread use of computers in the liberal arts may come as a surprise for business faculty members, who may have a stereotyped image of liberal arts faculty as being anti-computers. However, in many respects, the applications to the liberal arts are more creative and more

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6/ Archie J. Bahm, "Interdependence in Philosophy" in Interdependence: An Interdisciplinary Study. (Albuquerque: World Books, 1977), p. 94.

difficult than many business applications.7/

In history, computers have been used for a variety of projects including an analysis of the variables underlying the French Revolution, a computer simulation of a Roman wine and oil plantation, and an analysis of Caesar's army in Gaul, the purposes of which were:

> . . . first, to present a prosopographical list of Caesar's staff according to Caesar's narrative of the war and the supporting evidence from both classical and inscriptional sources; second, to provide a commentary on the prosopography which includes an analysis of the staff by rank, reevaluation of the officers of uncertain rank, and examination of Mark Antony's activities in Gaul, and a composite look at Gallic campaign officers who later deserted Caesar's standards or joined the conspiracy against his life.8/

In literature, computers are used to construct concordances, which analyze a text into its individual words, attaches to each word its location and some context, and lists the words in an alphabetical sequence. The computer can do this substantially faster than it can be done manually. One report suggest that in the late 1800's and early 1900's it took forty-three years to prepare a Chaucer concordance for the letters A to H.

Computers are also used to resolve authorship questions. (You'll be pleased to learn that it appears that Homer did indeed write all of the Iliad).

The field of music presents special challenges for the computer. Unlike literature, a special language must be constructed to represent its notation within the computer, and the timing of the music must be considered. In spite of these difficulties, music has been one of the more progressive humanistic disciplines to use the computer. The computer has helped resolve a longstanding dispute among musicians regarding the importance of harmony vs. counterpoint in the Bach chorales

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7/ An example is the pioneering efforts of Roberto Busa, S.J., to index the works of theologian Thomas Aquinas. See D. M. Burton, "Automated Concordances and Word Indexes: The Fifties," Computers and the Humanities, 15, (1981), 1-14.

8/ Linda M. Ricketts, "Caesar's Army in Gaul: A Computer-aided Prosopography," in Computing in the Humanities, Peter Patton and Renee Holoien, Editors, (Lexington, Massachusetts: D. C. Heath and Company, 1981), p. 197.

(harmony won),9/ as well as helping to understand how human listeners perceive and recognize sound.10/

Similar examples could be given from other liberal arts areas. But these brief examples, I hope, have sufficiently illustrated the point that the liberal arts presently utilizes the computer in a variety of ways.

The Business Faculty

The business faculty has two important areas of expertise which are useful in helping an institution cope with changes brought about by technology. The first is expertise in number crunching. This is particularly important because of the heavy use of computers for accounting, finance, and other management activities. It is likely that such applications will continue to be important in the future. Second, the business faculty in general and the marketing faculty in particular have a customer orientation which in this situation means the ability to (a) identify the needs potential student segments, (b) determine the types of courses or other activities that meet the needs of those segments, and (c) establish a mutually beneficial two way communications process with the student segments.

The skills of the business faculty complement those of the liberal arts faculty, and together form the neucleus of leadership on this issue within institutions of higher education.

The Conflict Between the Business and Liberal Arts Faculties

Getting the two faculties to work together is no easy chore. The two faculties view the world from different perspectives, and frequently are in conflict with one another.

You may have seen the somewhat controversial article regarding the conflict between the liberal arts and professional programs which appeared in the Chronicle in January. In it, Frederick Krantz makes several observations that seem to summarize how at least some liberal arts faculty members view business and professional programs within the university.

9/ Ann K. Blomback, "Harmony vs. Counterpoint in the Bach Chorales," Computing in the Humanities 15 (1982): 79.

10/ Martin Piszczalski and Bernard A. Galler, "Computer Aided Techniques for Understanding Performed Music," Computing in the Humanities 15 (1982): 89.

-As academics...we are not here to produce undergraduate trainees as replacement cogs for government and industry, but to encourage our students to become informed, thinking and sensitive human beings.

-Opposition to the current chaos must be maintained, enclaves once established must be enlarged, and, where and when possible, the heights of administrative power must be stormed.11/

It is interesting to note that while Krantz calls for a reform in the liberal arts curriculum, and a balance between liberal and professional programs, his militant suggestions on how to proceed seem to encourage further polarization and endless debate, all of which reduce the likelihood of change occurring.

Krantz's comments were quickly responded to by David Martin who decried the argument for polar extremes--the liberal vs. the xilliberal. But he then proceeds to fan the flames by stating that Krantz's comments are "often propounded by people whose distain for professional programs is rooted in their own flight to the academy as a refuge from reality."12/

This conflict between the liberal arts and professional faculties is exacerbated by the second factor--a shift in enrollments from the humanities to the professions.

Hard data on the declining enrollments in the liberal arts and humanities are not available. However, the fragmentary reports to that effect are consistent with the research findings about career decisions of students, which suggest that a sizeable number of students consider the earning power of a degree when making decisions regarding college.13/

The question remains of how to get these two faculties to

11/ Frederick Krantz, "The Liberal Arts' Noble Vision, Employment Related Education, and the Free-Market Curriculum," The Chronicle of Higher Education, January 11, 1984, p. 80.

12/ David A. Martin, Letter to the Editor, The Chronicle of Higher Education, January 25, 1984, p.30.

13/ Richard B. Freeman and John A. Hansen, "Forecasting the Changing Market for College-Trained Workers," in Responsiveness of Training Institutions to Changing Labor Market Demands. (Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1983), p. 80.

work together on this issue of the impact of computers on higher education. Traditional approaches, e.g. committees or task forces, will most likely fail because the participants hold markedly different assumptions about the world in general and the role of higher education in particular.14/

There is a technique that will result in good decisions regarding future action, and will do so in a way that allows these differing assumptions to be surfaced and openly discussed. That technique is known as stakeholder analysis. It is used by business and other organizations to sort through a large number of variables, both quantitative and qualitative, and make decisions about future activities. Essentially it addresses the question "What should we do?"

What follows is a description of such a process, borrowed from the field of strategic planning15/, which could be used in this situation. It consists of three preparatory steps, followed by stakeholder analysis.

Organizational Activities

The first preparatory activity is to form a steering committee consisting of members of the liberal arts and business faculties, plus anyone else whose presence is essential. The functions of the steering committee would be to:

1. Determine who should be involved in subsequent steps of the process.

2. Arrange for a facilitator to lead the sessions.

3. Make appropriate logistical arrangements.

Environmental Assessment

The second preparatory activity is an assessment of the external environment. The purpose of this step is to attempt to

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14/ For an excellent discussion of the historical conflict between the liberal arts and the professions see Albert William Levi, The Humanities Today (Bloomington: Indiana University Press, 1970)

15/ For a comprehensive discussion of stakeholder analysis and related techniques see Richard O. Mason and Ian I. Mitroff, Challenging Strategic Planning Assumptions, (New York: Wiley-Interscience, 1981).

reach agreement on (1) the present environment and (2) the environment as it might be n years from now.

Participants, selected by the steering committee, are organized into groups of six to twelve. Using the nominal group technique,16/ participants list and rank the importance of relevant external factors on flip charts.

To help ensure a comprehensive analysis, the external environment can be split into categories such as social, economic, political, legal/regulatory, and technological. Additional sub-categories that are particularly germane should be treated separately, such as trends in demographics, personal computers, and video technology.

It is to be expected that there will be some differences in the description of the external environment developed by separate groups. These differences need not be resolved prior to proceeding, since the nature of stakeholder analysis provides for the examination of key assumptions made about the external environment.

The Generation of Options

The flipchart listing of environmental factors, or typed versions thereof, are used as inputs to the third preparatory step, that of generating alternative courses of action. The generation of options is a creative process for which the nominal group approach is appropriate. After all options have been listed, the list is narrowed to those which appear to merit the use of stakeholder analysis. One way that I have done this in business settings is to circulate the list, including a brief rationale for each option, and ask other members of the organization to rate each idea on a scale of 1 to 10, with a high number meaning that the option should be considered for further investigation with stakeholder analysis.

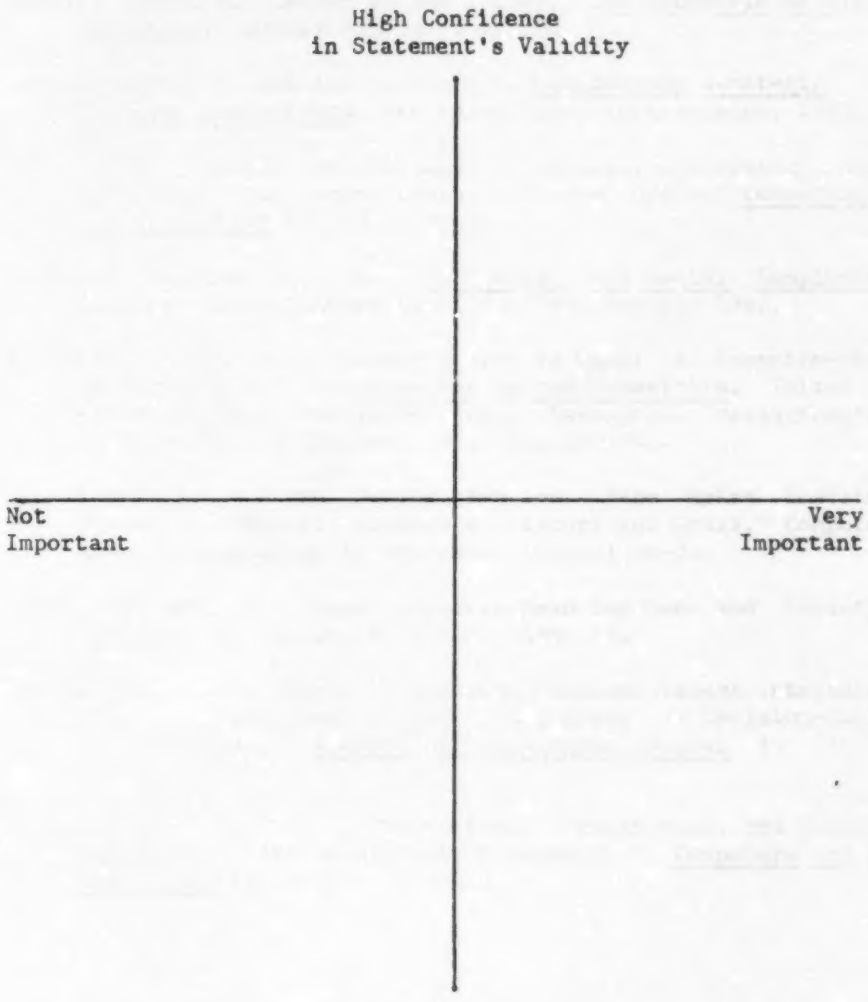
Stakeholder Analysis

Once an option has been selected for stakeholder analysis, the steering committee generates a list of stakeholder groups. Stakeholders are those individuals, groups or organizations that affect and are affected by the option.

16/ For additional information on the nominal group technique see A. H. Van de Ven and A. L. Delbecq, "Nominal Versus Interacting Group Processes for Committee Decision-Making Effectiveness," Academy of Management Journal 14 (1977): 203-211.

FIGURE 1

PLOT OF ASSUMPTIONS BASED ON RATINGS
ON IMPORTANCE AND CERTAINTY



The steering committee arranges for appropriate individuals to participate in the stakeholder sessions. The participants need not be a member of the stakeholder groups, although that is frequently desirable.

The stakeholder sessions are led by a facilitator selected by the steering committee. The stakeholder session begins with the facilitator inviting the group to revise the list of stakeholders (a process that occurs continually during the session). The facilitator then leads the group through a process which identifies the key assumptions that are being made about each stakeholder's future behavior.

These assumptions are listed on a flip chart, which is then taped to the wall for further reference and revision. After assumptions have been listed for all stakeholders, each list is scanned and those assumptions that are clearly not very important are scratched from the list.

Each remaining assumption is then rated on (1) importance and (2) confidence that the assumption is true. Assumptions are then plotted on a graph similar to the one shown in Figure 1.

Assumptions that are ranked as important, but for which there is uncertainty regarding their validity, are singled out for further scrutiny. Specific individuals are assigned to obtain additional information on these items in an attempt to reduce the uncertainty.

The session is adjourned and reconvened at a later date. At that time individuals report to the group the results of their search for additional information. Based on the additional information, all assumptions are then re-ranked on importance and certainty.

At this point there are four choices open to the steering committee:

1. The process can be recycled through the research phase.

2. The option is trash-canned in entirety.

3. The option is approved by the group and a recommendation is made that it be implemented.

4. The option is revised and submitted to stakeholder analysis.

While seemingly a laborious process, stakeholder analysis provides a thorough analysis of all the major facets of a proposed course of action. Assumptions which are frequently unstated will be surfaced and discussed in an open manner,

resulting in better communications and improved decisions.17/

Conclusion

The Chinese have a saying that every problem is an opportunity. We in higher education are faced with the problem of how to adapt to a future that is changing due to the computer and other related technology.

The combined skills of the business and liberal arts faculties can provide the leadership that institutions of higher education need to turn this problem into an opportunity--an opportunity to forge a new balance between the liberal arts and professional education that will benefit society as a whole.

17/ The benefits of surfacing and discussing underlying assumptions are presented in Chris Argyris and Donald Schon, Organizational Learning (Addison Wesley, 1978) and are summarized in Chris Argyris, "Double Loop Learning in Organizations," Harvard Business Review, September-October 1977.

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